thorough understanding of the impact of training grants. Also, the "hard" data will check on the chairmen's subjective responses to questions about their department's future if training grants are cut.

The surveys of the students will investigate their auxiliary financial resources and their intentions if training grant funds were no longer available. From the graduate students, the survey will attempt to determine if there would be a mass exodus from graduate studies following cuts in training grants. From undergraduates, NIH officials hope to learn how many students are lured into graduate studies in the health sciences by stipends and free tuition.

It might be asked, particularly by those who will spend hours filling out survey questionnaires, whether the entire effort is worthwhile, in view of the Administration's obvious prejudices against expenditures for graduate training. Phillip Chen, an NIH administrator who is directing the survey, told *Science* that OMB officials have indicated that they will fully consider the results of the survey before reaching a final decision about the training grants. Also, said Chen, NIH has never fully studied the impact of the training grant program, and the results could prove useful in several ways. Even if OMB decides to cut graduate training funds, results of the survey could make a case for retaining the 50 percent research support portion of the training grants.

—ROBERT J. BAZELL

Hiroshima after 25 Years: "We Are All Survivors"

Chicago.—It seemed appropriate for scientists to gather in Chicago a quarter of a century after Hiroshima to discuss what atomic weapons had done to them and to the world. Several scientists commented about how men who worked on the Manhattan Project here at the University of Chicago in 1945 tried to visualize what an atomic bomb would do to this city, and on the basis of that vision, tried to persuade Washington not to use the atomic bomb against the Japanese. One of those who went out on the streets of Chicago to imagine what horrors an atomic bomb would bring was Eugene Rabinowitch, longtime editor in chief of the *Bulletin of the Atomic Scientists,* whose words concluded the symposium.

It was one of those many publicly unnoticed sessions which take place every year at the AAAS meeting. It was not the kind of discussion to attract much press attention and there were no disrupters to bring out the cameras. Yet, hundreds of people came to hear about Hiroshima and many stayed through the marathon session—well over 3 hours. At least a few spectators termed it their most profound experience at an AAAS meeting.

Those who might have wanted to escape having to hear some of the agony of Hiroshima would have left early. Professor Warner Lee Wells of the University of North Carolina Medical School set the most somber tone for the discussion by telling of the physical effects to humans of the dropping of the Hiroshima bomb. "It's a painful experience for me to stand here today," Wells said in a faltering and emotion-choked voice. "It's like reliving a bad dream."

The panelists agreed that scientists' feeling of responsibility for creating the atomic bomb had made them become politically involved as they never had been before World War II and had made some of them devote much of their lives to trying to curb the growth of nuclear weapons. But they did not express satisfaction at what scientists had accomplished.

"The arms race has generally gotten worse in the last 25 years," said one speaker, George Rathjens, an M.I.T. political scientist. Rathjens, a former Defense Department official and arms control expert, bemoaned what he perceived as the Nixon Administration's renewed interest in nuclear weapons and its revival of the practice of "trying to make policies out of weapons" in a manner similar to U.S. actions at the height of the Cold War in the 1950's. Rathjens spoke of the greater dangers posed by more sophisticated weapons systems; he noted that a single Polaris missile fired accidentally would now destroy a city. In the near future, an accidentally fired Poseidon missile could destroy a dozen cities. Rathjens sounded an alarm about the continued drift on policies governing the use of the many tactical nuclear weapons in Europe, a confusion which could, under the right circumstances, quickly escalate into a general nuclear war. Rathjens argued that people have failed to understand the destructiveness of nuclear weapons. While a government official in the early 1960's, Rathjens said, he looked up a Soviet city the size of Hiroshima and found that a weapon fully 200 times as powerful as the Hiroshima bomb had been targeted for the Soviet city by the Defense Department.

At the end of the speeches, a spectator asked, "Why haven't scientists been more successful in helping control the arms race?"

Gar Alperovitz, president of the Cambridge Institute, said he thought that scientists, such as the late J. Robert Oppenheimer, had been too willing to "take almost anything from political authorities on faith, to keep their lives compartmentalized between their work and politics." Alperovitz said he thought that "young scientists were facing the problem of whether they will work on weapons or not in a much tougher way." Both Alperovitz and Rathjens said that one reason they were hopeful about young scientists was the strength of the March 4th Movement (an organization which was started at M.I.T. 2 years ago).

Yale University psychiatry professor Robert J. Lifton, author of *Death in Life—Survivor of Hiroshima,* said that, like the survivors of Hiroshima and other great holocausts, men today shared to some extent in a "psychic numbing." He said that men need to believe, at the least, in some sort of social or symbolic immortality and that nuclear weapons threatened that human need since they presented "an end of the world image." He believes

that modern men have not yet developed the cosmology to deal with the fact that nuclear weapons could destory everything that men believe should survive. "Scientists are still groping, as we all are," he said. "The question is, do we have time to do the psychological work as well as the political?"

Lifton believes that "we all share in this religion of nuclearism," the awe of a blind force that man has created which can destroy all that man has created. He said that some of those who watched the first nuclear blasts had undergone "a conversion experience"—a "conversion in the desert." Some scientists such as Edward Teller, Lifton argued, have "embraced this weapon as a nuclear deity." Lifton said that such scientists believe that these weapons can both destroy societies but also save them by preventing further wars. Other nuclear scientists, Lifton argued, have "the apocalyptic imagination," the feeling that they have a sacred duty to communicate the horrors of nuclear weapons to mankind.

One of those who has felt a compulsion to communicate during the past quarter of a century, Eugene Rabinowitch, told the symposium that he had recently visited Hiroshima. "There, people think the main problem is to get rid of nuclear weapons, all nuclear weapons." In Rabinowitch's opinion, however, all technically feasible weapons would eventually be used in case of conflict—"the crucial problem is to put an end to war."

Although the average television viewer and newspaper reader may have thought that the AAAS annual meeting here consisted mostly of foolish disruptions, he would have had a different opinion if he had heard these serious men discuss the legacy of Hiroshima.

"We are all survivors of Hiroshima," Lifton said and touched a responsive chord in his audience. "The nuclear scientists are prophetic survivors. They are the rest of us writ large."

—BRYCE NELSON

Bryce Nelson, a national correspondent for the Los Angeles Times, *reported on the AAAS annual meeting for that newspaper. He is a former member of the* Science *news staff.*

Carnegie Plans Telescope in Chile

The Carnegie Institution has announced that it will build a 100-inch optical telescope in the Chilean Andes at the institution's Las Campanas Observatory, which operates under a cooperative agreement with the University of Chile.

Construction of the $6 million telescope, scheduled for completion in late 1975, was made possible by a gift of $1.5 million from former DuPont president Crawford H. Greenewalt and Mrs. Greenewalt. Carnegie hopes to obtain additional funds from private and government sources.

The instrument is being designed by Hale Observatories, makers of the 200-inch Hale telescope, the world's largest, located at Palomar Observatory in California.

The new telescope, to be located 7600 feet high atop Cerro Las Campanas in North Central Chile, is especially designed for observations in the Southern Hemisphere. Because of the exceptional viewing conditions in Chile, it is expected to achieve the same range and clarity in the south as the great Hale telescope does in the Northern Hemisphere.

According to Dr. H. W. Babcock, director of Hale Observatories, the telescope will provide answers to questions about the nature and distribution of quasars and the symmetry of the universe, will help to identify radio and x-ray sources in the south, and will aid in the study of the evolution of southern stars and galaxies. Those galaxies closest to the earth's are most accessible to view from the Southern Hemisphere.

At present the largest telescope in the Southern Hemisphere is a 72-inch instrument at Radcliffe Observatory in Pretoria, South Africa; but several other big telescopes are under construction. The European Southern Observatory at La Silla, 30 miles south of Las Campanas, is building one with a diameter of 144 inches. Further to the south, the National Science Foundation's Cerro Tololo Inter-American Observatory is planning, with the aid of $5 million from the Ford Foundation, the construction of a $10-million, 150-inch telescope. In Australia, a 150-inch Anglo-Australian telescope is also planned.

The strip of coastal mountains where the observatories are located in Chile runs several hundred miles north to south and is generally thought to have the best conditions in the world for optical astronomy observations. The atmosphere is stable, and the Chilean skies are unusually dark and free of clouds, haze, dust, and pollution. There are no large cities nearby to cast interfering reflections, a phenomenon which is beginning to hamper the operations of some North American observatories (see *Science*, 5 February).—C.H.

RECENT DEATHS

William H. Atwood, 83; professor emeritus and former head, biology department, University of Wisconsin, Milwaukee; 20 November.

Desmond D. Bonnycastle, 59; dean, graduate school of biomedical sciences, and chairman, pharmacology department, New Jersey College of Medicine and Dentistry; 19 December.

Concetta B. Cabral, 48; professor of biology, Adelphi University; 22 December.

Laurence W. Durrell, 82; professor emeritus of botany and plant pathology and dean emeritus, College of Natural Sciences, Colorado State University; 1 December.

Charlotte L. Maddock, 72; former research associate in pathology, Harvard Medical School and The Children's Hospital; 18 November.

Joseph E. Markee, 67; former chairman, anatomy department, Duke University School of Medicine; 27 November.

Charles L. Mitchell, 87; retired meteorologist, U.S. Weather Bureau; 14 December.

Michael M. Ovchynnyk, 69; associate professor and curator of cold-blooded vertebrates, Michigan State University Museum; 4 December.

Lucile E. Swendsen, 74; professor emeritus of biology, University of Wisconsin, Milwaukee; 10 September.